

## Strong motion and source processes of the 2016 Kumamoto earthquake sequence

\*Shin Aoi<sup>1</sup>, Takashi Kunugi<sup>1</sup>, Wataru Suzuki<sup>1</sup>, Hisahiko Kubo<sup>1</sup>, Nobuyuki Morikawa<sup>1</sup>, Hiroyuki Fujiwara<sup>1</sup>

1.National Research Institute for Earth Science and Disaster Resilience

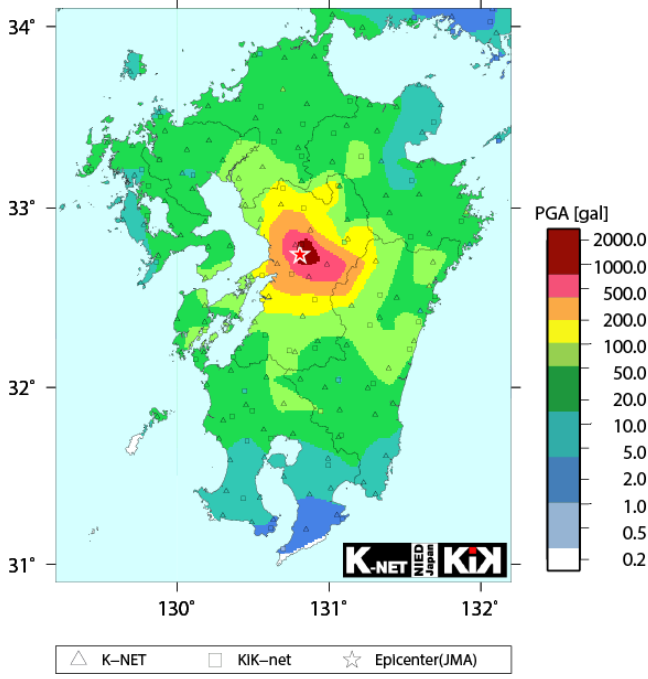
M6.5 (Mw 6.1) and M7.2 (Mw 7.1) earthquakes respectively attacked the Kumamoto region at 21:26 on April 14 and 28 hours later at 1:25 on April 16, 2016. Strong shaking with JMA seismic intensity (INT) 7 were observed for the both earthquakes at the Mashiki town of the Kumamoto prefecture. These earthquakes are considered to rupture mainly the Hinagu fault zone (Takano-Shirahata part) and the Futagawa fault zone (Futagawa part). The Headquarter for Earthquake Research Promotion performed the long-term evaluation of the fault zones with M7-calss potentials, and seismic hazard assessment estimated more than INT 6+. We here call the M6.5 event and the M7.3 event that occurred on the individual fault zones.

KiK-net Mashiki (KMMH16) recorded PGA more than 1000 gal, and ground motions were observed wider area for the 7.3 event than the M6.5 event. PGAs and PGVs of K-NET/KiK-net stations are consistent with the empirical attenuation relationship of Si and Midorikawa (1999). PGVs at longer distance than 200 km attenuate slowly, indicating the effect of Lg wave of western Japan. 5% pSv of the Mashiki town in Kumamoto shows a peak of 1-2 s that exceeds ground motion response of JR Takatori of the 1995 Kobe earthquake and the Kawaguchi town in Niigata of the 2004 Chuetsu earthquake. KiK-net Mashiki that locates 640 m apart from the Mashiki town observed large ground motion with a peak of 1 s. 5% pSv of the Nishihara village in Kumamoto shows 350 cm/s peak at 3-4 s. Ground motions at several stations in Oita exceed the attenuation relationship due to a triggered earthquake by the M7.3 event. PGAs of K-NET Yufuin (OIT009) records 90 gal for the M7.3 event and 723 gal for the near-by triggered event.

Source processes are analyzed using 16 and 27 K-NET/KiK-net/F-net strong motion stations located within an epicenter distance of 50 km and 100 km for the M6.5 and M7.3 events, respectively. Two pulses are observed at many station for the M6.5 event, and corresponding two slips near the hypocenter with a peak of 0.7 m and at north-northeastern with 0.6 m. As for the M7.3 event, large slip does not inverted for around 5 s after the earthquake initiation, then rupture propagated toward the northeastern shallow part reaching near the caldera of the Aso volcano with large slip with a peak of 4.6 m. The shallow slip is consistent with active fault surveys.

Keywords: the 2016 Kumamoto earthquake, strong motion, source process

2016/04/14-21:26 M6.5



2016/04/16-01:25 M7.3

